

IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

Claims 1-35 (canceled).

36. (currently amended) A method for implementing an extensible network-attached storage in a system including a plurality of computers, at least one secondary storage apparatus having a storage medium, which stores data in units each being a block, in which that can save said data is kept after shutting down a power source and an active network storage controller for inputting and outputting a block-based input/output (I/O) request between the computers and the storage medium; and a network or input/output (I/O) cable for connecting said computers with said secondary storage apparatus, wherein said secondary storage apparatus includes a plurality of storage units and said active network storage controller is equipped with a block access module which provides said computers with a block-based I/O function for reading data from one of said storage units or writing data to one of said storage units, wherein at least one application program is deployed in one of the computers processing data in units each being an object, a first computer and said application program issues object-based I/O requests to said secondary storage apparatus, each requesting for reading application data from a plurality of non-contiguous storage units of said secondary storage apparatus or for writing application data to a plurality of non-contiguous storage units of said secondary storage apparatus, said method comprising the steps of:

receiving an object-based I/O request from one of the computers;
sending downloading an object access module describing how a
requested object is stored in the secondary storage apparatus to the active
network storage controller said secondary storage apparatus from one of the
computers the first computer, or a second computer different from the first
computer, an object access module that implements an object-based I/O
function to reply to object-based I/O requests using the block-based I/O
function of said block access module;
implementing the object access module to convert the object-based I/O
request to a block-based I/O request;
sending the block-based I/O request to the secondary storage
apparatus;
receiving a response to the block-based I/O request from the
secondary storage apparatus; and
transmitting a response to the object-based I/O request
registering said object access module in said active network storage
controller to provide the secondary storage apparatus with the object-based
I/O function;
receiving in said secondary storage apparatus from the first computer
an object-based I/O request for said application data; and
performing said object-based I/O request by executing said object
access module.

37. (previously presented) A method according to claim 36, wherein
said object access module obtains a data value or location of data in a

storage unit corresponding to a specification, which is either an object, an object offset, an object offset size, or an object tag specifying the type of data to be retrieved.

38. (currently amended) A method for implementing extensible ~~network-attached second storage in a system according to claim 36, further including a plurality of computers, at least one secondary storage apparatus having a storage medium that can save data after shutting down a power source and an active network storage controller, and a network or input/output (I/O) cable for connecting said computers with said secondary storage apparatus, wherein said secondary storage apparatus includes a plurality of storage units and said active network storage controller is equipped with a block access module which provides said computers with a block based I/O function for reading data from one of said storage units or writing data to one of said storage units,~~

~~wherein at least one application program is deployed in a first computer and said application program issues object based I/O requests to said secondary storage apparatus, each requesting for reading application data from a plurality of non-contiguous storage units of said secondary storage apparatus or for writing application data to plurality of non-contiguous storage units of said secondary storage apparatus, said method according to claim 36, further comprising the steps of:~~

~~sending to said secondary storage apparatus from the first computer, or a second computer different from the first computer, an object access~~

~~module that implements an object-based I/O function to reply object-based I/O requests using the block-based I/O function of said block access module;~~

registering said object access module in said active network storage controller to provide the secondary storage apparatus with the an object-based I/O function;

~~sending to said secondary storage apparatus from the first computer, or the second computer, object description data indicating how said application data is stored on said secondary storage apparatus;~~

registering said object description data, which indicates how application data is stored in the secondary storage apparatus, in the registered object access module; and

receiving in said secondary storage apparatus from the first computer an object-based I/O request for accessing said application data; and

~~performing said object-based I/O request by executing said object access module using said object description data.~~

39. (previously presented) A method according to claim 38, wherein said object description data is data for specifying an attribute or an inter-block reference based on an offset and size of said application data.

40. (previously presented) A method according to claim 38, wherein said object description data is data for specifying an attribute or an inter-block reference by a lexical analyzing program or a parser generating grammar of said application data.

41. (previously presented) A method according to claim 38, wherein said object description data is data for specifying a file format of said application data based on whether the data stored in a specific part of one or more storage units contain some specific value or pattern.

Claim 42 (canceled).